

Appl. No. 09/929,270  
Amdt. dated December 30, 2003  
Reply to Office Action of June 30, 2003

PATENT

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings of claims in the application:

**Listing of Claims:**

1. (canceled)
2. (canceled)
3. (canceled)
4. (canceled)
5. (canceled)
6. (canceled)
7. (canceled)
8. (canceled)
9. (canceled)
10. (canceled)
11. (canceled)
12. (canceled)
13. (currently amended) A device for analyzing a sample containing nucleic acid, the device comprising:
  - a) a body having:
    - i) a reaction chamber for ~~chemically reacting the sample~~ subjecting the nucleic acid to an amplification reaction;
    - ii) a separation channel for separating ~~components of the sample~~ products of the amplification reaction;
    - iii) a transition region connecting the reaction chamber to the separation channel;
    - iv) at least a first valve in the transition region for controlling fluid flow between the reaction chamber and the separation channel;

Appl. No. 09/929,270  
Amdt. dated December 30, 2003  
Reply to Office Action of June 30, 2003

PATENT

- v) a side channel connected to the transition region for adding or removing fluid from the transition region; and
  - vi) at least a second valve for controlling fluid flow through the side channel; and
  - b) at least two electrodes coupled to the body, the electrodes being positioned to induce electrophoretic flow, electroosmotic flow, or isoelectric focusing of the sample components amplification products in the separation channel when a voltage difference is applied between the electrodes.
14. (original) The device of claim 13, wherein the valves comprise membrane valves.
15. (canceled)
16. (canceled)
17. (canceled)
18. (canceled)
19. (canceled)
20. (original) The device of claim 13, wherein the side channel connects to the transition region upstream from the first valve.
21. (original) The device of claim 13, wherein the side channel connects to the transition region downstream from the first valve.
22. (original) The device of claim 13, wherein the thermal conduction of the transition region is sufficiently low so that the transition region substantially thermally isolates the reaction chamber from the separation channel.
23. (original) The device of claim 13, wherein the separation channel comprises an electrophoresis or IEF channel containing separation material.
24. (original) The device of claim 13, wherein the body has a first reservoir fluidically connected to a first end of the separation channel and a second reservoir fluidically connected to a second end of the separation channel, and wherein the at least two electrodes comprise:

Appl. No. 09/929,270

Amdt. dated December 30, 2003

Reply to Office Action of June 30, 2003

PATENT

- i) a first electrode coupled to the body such that the first electrode is at least partially immersed in the first reservoir; and
- ii) a second electrode coupled to the body such that the second electrode is at least partially immersed in the second reservoir.

25. (original) The device of claim 13, wherein each of the electrodes is embedded in the body such that one end of the electrode protrudes through an external surface of the body and such that the other end of the electrode protrudes into an internal region of the body.

26. (original) The device of claim 13, wherein the body comprises a polymeric material, and wherein the electrodes are over-molded in the body.

27. (original) The device of claim 13, wherein the electrodes are screen-printed on the body.

28. (currently amended) A device for analyzing a sample, the device comprising a body having:

- a) a reaction chamber for chemically reacting the sample;
- b) ~~at least a first~~ a separation region comprising a plurality of ligand-binding sites;
- c) a transition region connecting the reaction chamber to the separation region; and
- d) at least one valve in the transition region for controlling fluid flow between the reaction chamber and the separation region.

29. (currently amended) The device of claim 28, wherein the body further includes a second separation region connected to the ~~first separation region~~ ligand-binding sites, the second separation region comprising an isoelectric focusing channel.

- 30. (canceled)
- 31. (canceled)
- 32. (canceled)
- 33. (canceled)
- 34. (canceled)

Appl. No. 09/929,270

Amdt. dated December 30, 2003

Reply to Office Action of June 30, 2003

PATENT

- 35. (canceled)
- 36. (canceled)
- 37. (canceled)
- 38. (canceled)
- 39. (canceled)
- 40. (canceled)
- 41. (canceled)
- 42. (canceled)
- 43. (canceled)
- 44. (original) A device for analyzing a sample, the device comprising:
  - a) a body having:
    - i) a reaction chamber for chemically reacting the sample;
    - ii) a separation channel for separating components of the sample;
    - iii) a transition region connecting the reaction chamber to the separation channel; and
    - iv) a side channel in fluid communication with the transition region;
  - b) a three-way valve at the junction of the side channel and the transition region; and
  - c) at least two electrodes coupled to the body, the electrodes being positioned to induce electrophoretic flow, electroosmotic flow, or isoelectric focusing of the sample components in the separation channel when a voltage difference is applied between the electrodes.
- 45. (canceled)
- 46. (canceled)
- 47. (canceled)
- 48. (original) The device of claim 44, wherein the thermal conduction of the transition region is sufficiently low so that the transition region substantially thermally isolates the reaction chamber from the separation channel.

Appl. N. 09/929,270  
Amdt. dated December 30, 2003  
Reply to Office Action of June 30, 2003

PATENT

49. (original) The device of claim 44, wherein the separation channel comprises an electrophoresis or IEF channel containing separation material.

50. (original) The device of claim 44, wherein the body has a first reservoir fluidically connected to a first end of the separation channel and a second reservoir fluidically connected to a second end of the separation channel, and wherein the at least two electrodes comprise:

- i) a first electrode coupled to the body such that the first electrode is at least partially immersed in the first reservoir; and
- ii) a second electrode coupled to the body such that the second electrode is at least partially immersed in the second reservoir.

51. (original) The device of claim 44, wherein each of the electrodes is embedded in the body such that one end of the electrode protrudes through an external surface of the body and such that the other end of the electrode protrudes into an internal region of the body.

52. (original) The device of claim 44, wherein the body comprises a polymeric material, and wherein the electrodes are over-molded in the body.

53. (original) The device of claim 44, wherein the electrodes are screen-printed on the body.

54. (original) A device for analyzing a sample, the device comprising:
- a) a body having:
    - i) a reaction chamber for chemically reacting the sample;
    - ii) a separation region for separating components of the sample;
    - iii) a transition region connecting the reaction chamber to the separation region; and
  - iv) at least one mechanical valve in the transition region for controlling fluid flow between the reaction chamber and the separation region;
  - b) a first electrode coupled to the body adjacent the reaction chamber;
  - c) a second electrode coupled to the body adjacent the transition region; and

Appl. N. 09/929,270  
Amdt. dated December 30, 2003  
Reply to Office Action of June 30, 2003

PATENT

d) a third electrode coupled to the body adjacent the separation region, the electrodes being positioned such that when a first voltage is applied between the first and second electrodes, the components in the sample are transported from the reaction chamber to the transition region, and such that when a second voltage is applied between the second and third electrodes, the sample components are transported into the separation region.

55. (original) The device of claim 54, further comprising a molecular weight filter for filtering species in the sample having a sufficiently high molecular weight, the filter being positioned in a channel between the second electrode and the transition region such that when the first voltage is applied between the first and second electrodes, the species are transported from the reaction chamber and collected on the filter, and such that when the second voltage is applied between the second and third electrodes, the species collected on the filter are transported into the separation region.

56. (original) The device of claim 54, wherein the body further includes:

- a) a side channel connected to the transition region for adding or removing fluid from the transition region; and
- b) at least a second mechanical valve for controlling fluid flow through the side channel.

57. (original) The device of claim 56, wherein the valves comprise membrane valves.

58. (canceled)

59. (canceled)

60. (canceled)

61. (canceled)

62. (original) The device of claim 54, wherein the body comprises a polymeric material, and wherein the electrodes are over-molded in the body.

63. (original) The device of claim 54, wherein the electrodes are screen-printed on the body.

64. (canceled)

65. (canceled)

Appl. No. 09/929,270  
Amdt. dated December 30, 2003  
Reply to Office Action of June 30, 2003

PATENT

- 66. (canceled)
- 67. (canceled)
- 68. (canceled)
- 69. (canceled)
- 70. (canceled)
- 71. (canceled)
- 72. (canceled)
- 73. (canceled)
- 74. (canceled)
- 75. (canceled)
- 76. (canceled)
- 77. (canceled)
- 78. (canceled)